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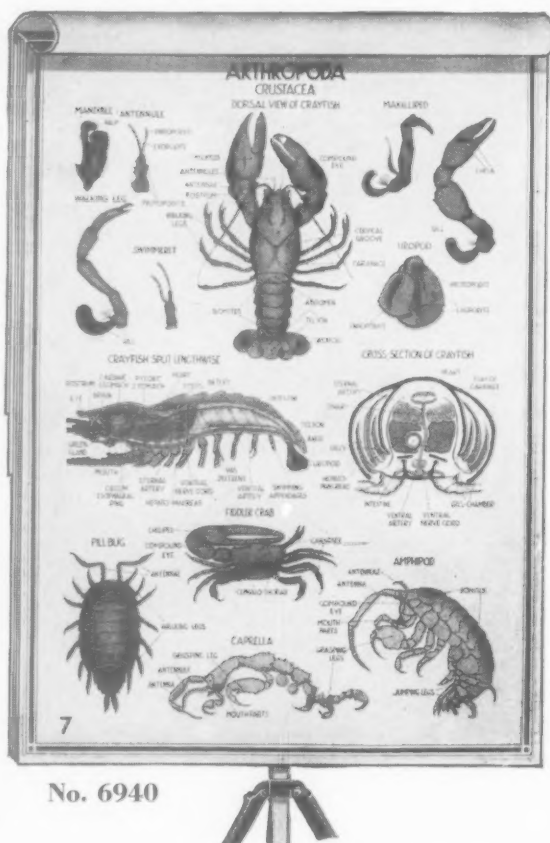
| | |
|---|-----|
| The Use of a Portable Laboratory in Field Biology Courses - - - J. Eugene Mielcarek | 125 |
| Providing and Adapting Apparatus and Equipment for Teaching Biology - Harry E. Duke | 128 |
| Kodachrome Viewer - - - Roberta Popinger | 131 |
| Message from the President - - - - - | 132 |
| Conservation Project Gets Underway - - - - | 132 |
| The Philadelphia Meeting - - - - - | 134 |
| Letters to the Editor - - - - - | 135 |
| Election Notice - - - - - | 138 |
| Biological Briefs - - - - - | 140 |
| Reviews - - - - - | 141 |

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The Use of a Portable Laboratory in Field Biology Courses

J. EUGENE MIELCAREK

Gannon College, Erie, Pennsylvania

In conducting courses in Field Biology at Gannon College, we have encountered three major problems.

1. Although field study gives the student opportunity to study living organisms, the student too often is overly impressed with the importance of the killing jar. Many times the only life activity observed is a futile attempt of the specimen to escape the collector. We find that one of the reasons for this is that students associate collecting and killing with the field trip and think of the laboratory as the logical place to study and classify dead specimens.
2. In addition to the loss of opportunity for studying living specimens, there is too great a time interval between collection and concentrated study of the specimen. This results in a loss of interest on the part of the student.
3. There is loss of time and considerable confusion in the process of labeling collected specimens and recording collection data.

We find that a portable field laboratory can solve all of these problems to a great extent. Our equipment includes the following:

- An old station wagon
- An Army surplus foot locker
- A folding table
- A Celotex board measuring 3×6 feet
- Several small laboratory stools, adjustable for height
- Two miniature cameras, one for black and white film, the other for color film
- Microscopes
- Laboratory type magnifiers
- Large paper for mapping
- Drawing equipment
- Reference books
- The usual collecting equipment.

If the area to be studied is easily reached by automobile, all of this equipment is transported there in the station wagon. If foot travel is necessary from the road to the area, the equipment is carried in the foot locker by two students. The light folding table and Celotex board are also taken. Upon entering the area, a central station is set



up immediately. If the station wagon is taken the tail gate serves this purpose. If the car cannot be taken, the folding table is used and the Celotex board is placed on top of the table to provide more working area. This light Celotex board is extremely useful in that specimens (especially botanical), drawing paper, and the like, can be easily pinned to it. The foot locker is opened, exposing a number of partitions, each with equipment. The inner surface of the top serves as a rack for instruments. It is usually possible to find the proper combination of sticks to raise and support the foot locker to a more comfortable working height.

The students are assigned areas radiating from the central station. Their positions, of course, depend upon the ecological problem involved. It is the

proper use of this portable laboratory which makes it valuable. The instructor must place stress not on the number of specimens to be observed or collected but on the quality and completeness of these observations and study. The equipment at the central station simply provides the student with adequate laboratory and library facilities at the time when his specimens are of the greatest interest to him. A blank report sheet, with headings concerning collection data and most important observations on the life activities of the specimens, is filled out by the student. Again, the quality rather than the quantity of these reports must be stressed by the instructor. The student should be encouraged to know thoroughly the habitat of the specimen. Fortunately, the habitat is nearby so that if his detailed study at the central

station stimulates questions concerning social communities to which the specimens belong, the student can return to that area for more information.

If the student wishes to preserve organisms which he has already studied, he will find facilities for this in the foot locker. Several blocks of wood with cavities holding shell vials and jars of various sizes are assigned to each student. He needs simply to put a number corresponding to the number of the report on the jar for preservation. This eliminates the possibility of specimens

being misplaced and makes it unnecessary to fill out small specimen labels in the field. This can be done more conveniently and neatly at a later date.

In conclusion, the portable laboratory used properly aids in persuading the student to study life, in maintaining the student's interest in his specimens and in satisfying the student that he has done a more complete piece of work. It saves time, confusion and makes the field trip more thoroughly enjoyable to the students and the instructor.



SELECTED REFERENCES ON THE TEACHING OF SCIENCE is the title of Circular No. 308-11, prepared by Philip G. Johnson, Specialist for Science, W. Edgar Martin, Assistant Specialist for Biological Sciences, and Willis C. Brown, Assistant Specialist for Aviation. Books, yearbooks, and magazines on the teaching of science are sources of help to teachers and curriculum leaders who wish to improve instruction. The list of such books is limited to those published in the period 1930-1949. *The American Biology Teacher* is one of ten professional magazines included in the circular, which may be obtained from

the Division of Secondary Education, Federal Security Agency, Office of Education, Washington 25, D. C.

NURSING EDUCATION: On September 12, the House Interstate and Foreign Commerce Committee started public hearings on the Bolton Bill (HR 910) which proposes federal aid for nursing education. It is aimed at alleviating the shortage of nurses essential for the Nation's health. While essentially a long-range program, its sponsors point to its value in helping to meet the present emergency need for nurses.

Providing and Adapting Apparatus and Equipment for Teaching Biology*

HARRY E. DUKE

High School, Dearborn, Michigan

Since I have been connected with the teaching of biology at Dearborn High School since 1928 my contribution will be based upon my experiences there. We have tried out all sorts of laboratory apparatus and procedures; kept some and discarded others. As there can be no real science without experimentation we must teach the experimental way. This then calls for a certain amount and kind of equipment.

The first attraction for beginning biology students seems to be the compound microscope. In fact, many students tell us they elected this course because they wanted to learn how to use this instrument. At least one compound microscope for every two students in the class, and one low-power dissecting scope for each individual student seems to be an inescapable necessity for satisfying the natural curiosity of these new biology students. We found it necessary, however, to number all microscopes rather conspicuously and ask each student to use only the numbered one assigned to him throughout the semester. This we think acts as a deterrent to stealing the removable parts. Some biology teachers claim they have had trouble because students sometimes took mirrors from the microscopes. It is a good policy to keep an eye on the microscopes lest they get beyond the repair stage. In the past we sometimes permitted the "traveling repairman" to go over the microscopes but we always regretted it afterwards. It is much bet-

ter to return them to the company of purchase for repair and readjustment where replacement parts are more readily available. Then, too, there is the company's prestige and guarantee back of it. Trading in old models doesn't pay as there is only a slight allowance given. Better donate them to elementary general science classes as the lower power can usually be made to function. It's the high power fine adjustment mechanism that seems to break down.

Now something about microscopic slides. Two small metal cabinets for storing prepared slides are very desirable—one for storing permanent slides and one to be used by the students as a temporary storage for the slides they make but for which they lack sufficient time to study during the period. Many of their slides are easily kept over in the slide cabinet until the next day or so. For example: a blood slide which requires staining and drying might take up too much time for the student to examine it thoroughly during that laboratory period. Before purchasing a set of permanent slides ask the prospective company to submit samples on approval or if you do purchase them from catalog descriptions alone have an understanding that they may be returned immediately should you see they would be entirely unsuited for the purpose you intended. Otherwise you may find yourself stocked with sets of unusable slides—probably slides meant for college botany or zoology.

So often one sees a much puzzled and perplexed student trying to make out certain specified areas on a prepared slide. Perhaps his laboratory manual

* An address delivered at the Annual Conference of Teachers of Science in the Larger High Schools, at the University of Michigan, May 12, 1951.

tells him to locate the vascular bundles in a stained cross section of some typical dicot stem and he is attempting to distinguish the phloem, cambium, and xylem areas. If necessary to give him an assist remove the ocular, place a small ink dot with your pen on the lower lens of this ocular, return it to the microscope barrel, then adjust the slide so the dot appears on or near the area in question. The ink spot will be out of focus of course but nevertheless easy enough to see. This entire procedure need not take over 30 seconds. (The dot is very easily removed afterwards.)

Another way to help is to have a photograph of the prepared slide made up previously and use that to point out to the student the required structures he is attempting to find. There are always some students with the "camera bug" who would welcome the chance to make up a set of photos of your slides for you, if you will give them some instructions. I have made several photos myself from the microscope with an old model 35 mm. Argus camera. Get a simple adapter ring to hold the camera onto the microscope, go into the physics dark room and use an artificial substage light which is not too bright. Set the camera distance at infinity and make a time exposure. Be sure to keep some record of your exposure time as you will have to make several exposures at different timings. You'll get some bad pictures but you will also find it isn't as hard as you might anticipate. Students catch on easily and often get several good pictures their first attempt.

Coming now to dissection and dissecting sets, we think it pays to assemble our own instruments by specifying just what quality we want for each set. Cheap instruments are of poor quality and give out quickly without ever having done a good job in the first place. Good scalpels and scissors can always

be resharpened and their usefulness prolonged. Each student should be assigned the same numbered set which he is to use throughout the semester. Even the individual instruments of the set may be numbered by using an electric vibro tool. It is inexpensive and may be used to mark metal or even glassware.

As to procuring equipment most large city school boards send out bids to different companies. However, we more or less recently have gained the privilege of specifically designating from what company we want certain purchases made. I think we should never requisition small items like sandpaper, cheese cloth, etc., from scientific companies when they can be purchased so much cheaper from local stores. We have a small fund called "petty cash" which takes care of such small items as they arise.

Going back to scientific supply houses, we have found some of them strong on apparatus but very weak as far as preserved biological materials are concerned. If an unusually poor shipment does arrive it is best to make a request for replacement or at least get credit for it. All companies we deal with have made adjustments without hesitation. I remember one shipment of preserved crayfish we received—in fact I can smell them yet. They were no doubt partially decayed before they ever hit the preservative. Of course they were replaced so it is pretty much our own fault if we fail to take the trouble to complain about bad material.

One should always give complete specifications—for example if you order preserved frogs from the catalog specify the species, size, and that you want the sexes divided at least equally. Otherwise you will get too many female frogs full of eggs, with greatly swollen oviducts making a very messy dissection.

In this shape the ovaries are not distinguishable and other organs are pushed too far out of their normal position. Preserved crayfish with curled under abdomens are not good either—specify in your order that abdomens are to be straightened out otherwise the abdomen will break during a dissection to find the ventral nerve cord.

One thing in particular I can hardly stress too much; biology teachers must make a special effort to get the best available in quality when ordering preserved materials. A number of students suffer some shock when they get their first dead laboratory animal for dissection. Poor laboratory materials have a bad psychological effect on students. Cheap and poorly prepared frogs giving the appearance of having died in great agony because their legs are cramped up and their tongue sticks out should be avoided by all means. This can be prevented by specifying that legs are to be extended and bodies internally preserved as well as externally. This does not mean we need to get expensive injected frogs either.

Preserved specimens being worked upon by students may be stored in quart size Mason jars furnished by the students themselves. Two students can use the same jar and that conserves laboratory space of which most of us have too little. Have students put stickers with their name and class hour on the jars to make them readily identified.

Large 7-inch diameter finger bowls have many uses and they stack up very readily when not in use. We use them in which to culture protozoa or as containers for hatching frog eggs as their large surface area promotes easier oxygen absorption from the air.

A number of interesting projects can be done with very simple equipment. Take for example the study of some in-

sect like a grasshopper. All one needs is his dissecting kit, a piece of 5×7" cardboard with some scotch tape. The wings may be mounted as in flight position, legs and mouth parts may be taped onto the card and perhaps one drawing—such as the cornea as it appears under the microscope—all on the same card. This helps to overcome the distaste some students have for too many drawings. Other projects adapting themselves to taping on cardboard are; crayfish mouth parts—labeled of course, and also the skeleton of one hind leg of a frog to show the ball joint, hinge joint, and the different bones composing the leg.

Next I should like to mention some miscellaneous small equipment of considerable usefulness. First; safety razor blades for making many fresh material slides. They will cut much thinner sections than a knife or a scalpel. Second; an old bit used in wood boring can be used to remove the center of a carrot for use in an osmosis demonstration where the hollow thus made is filled with colored liquid and then a glass tube with a cork attached placed in the opening at the top of the carrot. In drilling out this center it is best to hold the bit flat on the edge of the table and then force the carrot into the bit—turning the carrot but not the bit. Third; a blood lance for a human blood slide. Students take a great interest in preparing a slide of their own blood. Let them use Wright's stain to see how well it shows up the white corpuscles. Fourth; deep-well slides are very useful with which to examine pond water for aquatic larvae, volvox, hydras, etc.

Lastly I should like to mention some desirable accessories that may be within range of your budget.

- (1) An aerating pump for the heavily populated aquarium especially during the darker winter days.

- (2) A small electric, thermostatically controlled oven may be adapted to the hatching of chicken eggs. You may use it to teach a little embryology by opening the eggs after 48 to 72 hours incubation to show heart beat. Let some of the eggs hatch and you will be surprised at the interest shown by the students.
- (3) A disarticulated human skeleton—one that the student can handle is much more of a challenge to them to learn the bone identifications than a skeleton carefully articulated and hung up in a glass case.
- (4) A plaster of Paris or papier-maché dissectable torso of the human being always stimulates a lot of interest. It gives so much better notion of organ location because of its third dimension.
- (5) A blood pressure apparatus—a second-hand one as they are expensive or possibly one loaned by a local physician to demonstrate the principle of its use.

I think we as science teachers should plan to build up our laboratories by adding at least one important piece of apparatus or equipment each year. Let's not be satisfied with only replacing last year's casualties. Can't our laboratories take on something of a new look each year so that our alumni returning for a visit some few years hence can never say, "This place looks just like it did when I took biology"?

WATER POLLUTION IN THE UNITED STATES, a report on the polluted condition of our waters and what is needed to restore their quality, will be of interest to biology teachers everywhere. It may be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., for 35 cents.



KODACHROME VIEWER

In our Biology Department we have more than 500 thirty-five millimeter colored slides that illustrate certain phases of our work. Many of the good slides were not being seen by all pupils. To make it possible for everyone to see more of them we built a viewer box. Now it is used often and those pupils who wish to can benefit from it.

Our viewer, which is shown in the picture, was made in the school shop. The outside dimensions are $8 \times 8 \times 22$ inches. It has a hinged top, a fifteen-watt fluorescent lamp in the white enameled interior and an electric switch on the outside.

Some of the scenes are too small to be seen very well so we keep a magnifying glass on the top of the cabinet to provide some magnification.

The viewer is bother as well as benefit. Labels to explain the slides must be made and the slides must be removed and replaced in the storage cabinet. Very often the teacher is the only one who can do this well. But in spite of these added duties it does supply variety in our work.

ROBERTA POPINGER,
*Roosevelt High School,
Cedar Rapids, Iowa*

NOTE: Miss Popinger is a pupil of S. M. Pattee, biology instructor in Roosevelt High School.

Message From the President

We are rapidly realizing the results of the increased interest and activity on the part of our officers and committeemen.

The receipt of the ten-thousand dollar grant from the American Nature Association will make it possible for our Conservation and Outdoor Education Committee under the leadership of Lydia Elzey of State College, Pennsylvania, to perform a very important service to education and for NABT. The Liaison Committee has been helpful in the promotion of this and other financial assistance under the leadership of Edgar Martin of Washington, D. C.

Prevo Whitaker of Bloomington, Indiana, chairman of the Education Committee, has reported on the activities of the AAAS Cooperative Committee and has developed a plan of action.

The Health Committee has been unusually active under the chairmanship of Clifford Knapp and a valuable report will soon be forthcoming.

The Membership Committee is still in the process of getting organized and equipped for action. Various delays will make it necessary for the main membership drive to be launched early this fall after school opens. Robert McCafferty has been very helpful in getting the stationery and folders printed at cost at his high school. Frances Gourley, membership chairman, has secured acceptance of nine regional chairmen

and of over half the state chairmen. She will welcome any help on this important work from any other members.

Dr. D. F. Miller has been active in getting suggestions for a revision of the Constitution, particularly on the matter of setting up a board of Directors with overlapping terms to help give more continuity to our work.

The Nominating Committee under the leadership of Lydia Elzey of State College, Pennsylvania, has already completed its job for our next election.

Dr. Betty Lockwood has done a magnificent job in getting the business affairs of ABT organized and to get us back in the black again. She finds it necessary to turn over this phase of the work to someone else now so we have again been fortunate in having Mrs. Muriel Beuschlein of Chicago accept the Managing Editorship.

Our Editor too has been carrying most of the burden of the editorial work. We are pleased to announce the appointment of an assistant editor. Dr. B. Bernarr Vance of Dayton, Ohio, has agreed to help with this important job.

We look forward to a new format for our magazine with the fall issues, a lot of new members as a result of our membership drive, a great deal more interest in health and conservation education, and a much stronger NABT program generally.

Conservation Project Gets Underway

The three-year conservation project of THE NATIONAL ASSOCIATION OF BIOLOGY TEACHERS which was made possible by a \$10,000 grant-in-aid by the *American Nature Association* has been organized by the seven-member Executive

Committee for the project. They are Dr. E. L. Palmer of Cornell University, Ithaca, N. Y.; Miss Lydia Elzey of Penn. State College, State College, Penn.; Dr. George Jeffers, Longwood College, Farmville, Va.; John Harrold,

Secretary, NABT, Midland, Michigan; Dr. Howard Michaud of Purdue University, Lafayette, Indiana; Dr. Leo Hadsall, Fresno State College, Fresno, California; and Dr. Richard L. Weaver, N. C. Department of Public Instruction, serving as President of the National Association of Biology Teachers and Project Coordinator.

Nine Regional Chairmen of National Association of Biology Teachers will guide the conservation project in their areas. They are Mabel Potter of Massachusetts, Joseph Horvath of Pennsylvania, Robert McCafferty of Ohio, Rex Conyers of Missouri, Charles E. Packard of Virginia, Aldina S. Gates of Louisiana, Clifford Knapp of Montana and Leo Hadsall of California.

State Chairmen for the project are being selected now to organize the work at the state level and to serve on the National Committee. An Advisory Committee composed of representatives of various conservation and professional educational groups is being organized to advise and assist the Project Committee. Some of these organizations will possibly be engaged in similar studies for other levels of instruction and the studies can supplement each other.

The project will include regional and state work conferences of biology teachers to review programs in conservation education, exchange experiences on the relative values of various teaching techniques and to prepare some unit teaching materials.

As state committees are organized a consultant will be requested to work with them from each State Department of Education, State Department of Conservation and State Teachers Association. Each chairman will determine the size of his committee. The duties of the state chairmen and committee will consist in part of the following:

1. Work with regional Chairmen and Project Coordinator in setting up a regional work conference during the next two years.
2. Work with the three state advisers to decide how best to do some of the following things:
 - A. Locate outstanding biology teachers who are emphasizing conservation in their teaching.
 - B. Collect descriptions of special teaching techniques employed by these teachers. (Which would illustrate parts of C.)
 - C. Help develop and perfect a set of "criteria of good teaching practices adapted to conservation education in high school biology."
 - D. Organize sub-committees or encourage individuals to write up special units on conservation adapted to the biology program for that section of the country.
 - E. Assist in preparing, collecting, and editing some of these materials for publication, in the "American Biology Teacher" and "Nature Magazine" and other publications and also some as special individual leaflets or teaching units for other teachers.
 - F. Be responsible for a report on the status of conservation education in his state as demonstrated by High School biology Teachers. This would form part of the final report on the three-year project to be published by the National Association of Biology Teachers and the American Nature Association.
 - G. Keep the Regional Chairman and the Project Coordinator informed as to progress, and need

for materials and help by the Executive Committee.

Work conferences are being held in several states this fall as a part of the meetings of state teacher's associations, particularly in North Carolina and Indiana. As rapidly as state chairmen can be selected and plans completed other states will organize work conferences.

The first of four regional conferences is scheduled for Philadelphia as a part of the annual meeting of National Association of Biology Teachers on December 28 at Hotel Adelphia. Representatives from the New England, Middle Atlantic, and Eastern coastal states as far south as North Carolina will be particularly invited to this work conference, which will be held under the leadership of Dr. Richard L. Weaver and the regional chairmen for regions I, II, V. The experience of this work conference will help determine the plans for the others scheduled for the deep south, the far west and the central states.

The Conservation Project Committee is particularly anxious to enlist the help of all our members interested in conservation and any others, whether members or not, who can help do any of the following.

1. Compile as accurate an account as possible of the extent of conservation education in High School Biology programs in each state.
2. Prepare descriptions of special techniques used and of units of study for publication.
3. Develop the best set of criteria possible on good teaching practices in conservation education adapted to the various regions of the United States.

Submitted by
RICHARD L. WEAVER,
President, NABT

THE PHILADELPHIA MEETING

The annual meeting of THE NATIONAL ASSOCIATION OF BIOLOGY TEACHERS will be held December 27-30 at Hotel Adelphia in Philadelphia as a part of the AAAS Convention. National Association of Biology Teachers is cooperating with National Association of Science Teachers and the American Nature Study Society in sponsoring three joint sessions in the morning of December 27, 28 and 29.

Your President, Dick Weaver, is responsible for the planning of the first of these joint sessions which will be devoted to "Adapting Science Instruction to the Developmental Needs of Children." Dr. Rose Lammel of New York University will give a talk on this topic and then there will be discussion groups of 20-25 people led by various members of the three cooperating organizations.

Dick Westwood, Past President of American Nature Study Society is responsible for the second joint session on "Adapting Science Instruction to Community Needs." Teachers will describe how they have organized their work to do this.

Art Baker, President of National Science Teachers Association is arranging the third of the joint sessions on "Adapting Science to Meet National and International Needs."

Dr. Harvey Stork, President-Elect of National Association of Biology Teachers is arranging for two of the afternoon NABT programs on December 27 and 29. On December 28 there will be a workshop on conservation education directed by Dick Weaver and Dr. E. L. Palmer, to evaluate present programs of conservation education and to make plans for the preparation of some curriculum materials and in-service education programs. This will be the first of four regional conferences sponsored by NABT as a part of the new conservation project made possible by the grant of \$10,000 by the American Nature Association.

The Board of Directors will hold meetings December 27-28 and 29 from 8-10 A.M. to develop plans for 1952. The Membership Committee will meet December 28, 8-10

A.M. The Conservation Committee will meet December 29, 8-10 A.M.

The National Association of Biology Teachers will co-sponsor an all-day field trip with American Nature Study Society on Sunday, which is being arranged by James Fowler of the Philadelphia Academy of Science.

A joint dinner will be held by all three societies with square dancing as one of the features.

Dr. Lily A. Weirbach is serving as general chairman of the local committee as an NABT representative and Charles Knopf is serving as chairman of NABT luncheon arrangements. Dr. Weirbach has organized a strong local committee to help with the registration, promotion, physical arrangements, entertainment, dinners, field trips and exhibits.

Send in your reservations for rooms on the application blanks printed elsewhere in the magazine. Our headquarters will be Hotel Adelphia.

Plan now to attend and to bring some of your friends. It will be one of our best conventions.

LETTERS TO THE EDITOR

Dear Dr. Breukelman:

I should like to commend you for publishing the very excellent letter of Dr. Arthur W. Jones in the January issue of *The American Biology Teacher*.

... The perversion of Darwin's pioneer ideas has too long provided a convenient basic principle for shameful and disastrous behavior on the part of man towards man; currently it offers a ready-made philosophy for the perpetuation of such behavior on a grander scale. Dr. Jones has made a timely plea for consideration of evidence which contradicts this philosophy and has assembled facts to support his views.

Dr. Ashley Montagu, whom Dr. Jones mentions, has written a little book, *On Being Human* (Schuman, N. Y., 1950) The evidence he presents is worthy of attention. In contrast to the fatalistic consequences of adherence to Social Darwinism—the struggle

that can result only in extinction—he offers the refreshing hope that man may yet build a better society on the basic principle of cooperation.

Sincerely yours,

LELAND H. TAYLOR,
*West Virginia University,
Morgantown, W. Va.*

Dear Editor Breukelman:

A few minutes "breather" permits me to write concerning the letter of V. T. Dimitroff, Paul Smith's College, Paul Smiths, New York, printed in the January 1951 issue.

Mr. Dimitroff's forthright criticism is belied by the fact that he has supplied an important and interesting report of the National Conference on Premedical Education of October, 1950. This should be of value not only to those of college level but also to the secondary school biologists who are shaping vocational trends in formative years.

I must differ with Mr. Dimitroff. The journal and the organization are, for me, very excellent, fulfilling a need that should be met. The biologists of all levels must be made to see that there is mutual interest and interdependence. We are breaking down barriers, not erecting them in this day and age of community of purposes and aims.

Mr. Dimitroff works in marvelously beautiful country. Let him supply the rest of us with some of the biology inspired by living in the Adirondack environment. We could all benefit from it, high-schooler or college professor alike. Let's have some contributions from the rich resources of Paul Smith's.

Very sincerely yours,

CHARLES E. PACKARD,
*Randolph-Macon College,
Ashland, Virginia*

NEW ASSISTANT EDITOR

It is with pleasure that *The American Biology Teacher* announces the appointment of B. Bernarr Vance as assistant editor. He is well known to all members of NABT and readers of ABT, both for his many services to the association and its journal and for his excellent work as

a teacher, author and missionary for the scientific attitude.

Among his other duties, the handling of the full-length manuscript will be Mr. Vance's special job. All such manuscripts may be sent, as was true in the past, to any member of the editorial staff. They will however be referred in the future to Mr. Vance, who will process them and pass them on to the editor-in-chief. All short items, letters, reviews, news notes and the like should be sent directly to the editor-in-chief, as in the past.

It is hoped that this division of duties will lead to better and more careful consideration of all types of material submitted for publication in *The American Biology Teacher*.

INTERNATIONAL COMMISSION FOR PLANT SLIDE EXCHANGES

For many years there has existed an acute need for some method whereby microscope slides of plants from all over the world could be made available to those needing them for any purpose. In the newly published "Anatomy of Dicotyledons" Metcalfe stresses the importance of building up reference collections of slides, particularly at every institution where taxonomic investigations are carried on. Many, if not most, such institutions lack the personnel and facilities for the preparation of slides, and there are also difficulties in the way of securing the necessary material from other regions.

The most practical method of obviating all the difficulties mentioned above appeared to be the establishment of an INTERNATIONAL COMMISSION FOR PLANT SLIDE EXCHANGES, to which materials might be sent for processing and from which participants could receive in exchange any available slides that they might desire. This Commission has now been established under the auspices of the Botanical Section of the International Union of Biological Sciences in cooperation with the California Botanical Materials Company, in the laboratories of which the materials will be processed.

The aim of the Commission is to enable cooperating institutions and individuals to build up reference slide collections by exchanging plant materials sent in by them for slides processed from either these materials or from those forwarded by others.

Any individual botanist, department of botany or botanical institution may become a member of the Commission upon payment in advance of an annual fee of ten dollars (\$10.00, U.S. Currency). Fees will be used solely for overhead expenses such as the preparation of lists of slides, slide boxes, postage, clerical assistance, etc.

Members are expected to collect and fix properly for slide-making purposes plant materials indigenous to their respective regions or collected elsewhere by themselves. All plants from the algae on are to be included, as are all plant structures. The two standard microtechnique manuals should be used for guidance in collecting: Johansen, *Plant Microtechnique*, or Sass, *Elements of Botanical Microtechnique*. If desired, detailed instructions concerning specific plants may be obtained from the Chairman. Each collection should be sufficient for a minimum of 2,000 slides. A series of developmental stages is far more preferable than material all of one stage. Materials are to be shipped in fluid to the Commission, carriage charges to be borne by the shipper. Each collection must be accurately identified as to genus, species and structure, and each species should be accompanied by a herbarium voucher giving all requisite data. These specimens will be deposited by the Commission in the Herbarium of Pomona College, and will be available on loan.

Each collection, upon receipt and acceptance by the Commission, will be given an exchange value of 10 slides. Materials which duplicate those previously sent by others may be given a lesser exchange value, depending upon their usefulness.

Members are entitled to receive in exchange any slides that they desire, up to the total of their allowances, whether these are prepared from materials sent by themselves or by others. An indication of what is desired should accompany the material and lists of available slides will be returned for selection.

The extensive slide collections of the California Botanical Materials Company, numbering in excess of 6,000 individual items, will be used as a nucleus for exchange purposes.

Slides will not be received for exchange. The Commission does not duplicate the aims or purposes of the International Depository of Cytological Slides, another member of the Union. However, one example of all cytological slides processed by the Commission will be sent to the Depository.

In return for its services and for providing the necessary supplies, the California Botanical Materials Company has been authorized by the Council of the Botanical Section of the International Union of Biological Sciences to sell, at its established prices, surplus slides of any materials forwarded to the Commission, to any who may desire them without becoming members of the Commission.

Address all communications and shipments to:

DR. D. A. JOHANSEN, *Chairman,*
International Commission for
Plant Slide Exchanges,
861 East Columbia Avenue,
Pomona, California, U.S.A.

NEW MANAGING EDITOR

With this issue the duties of the managing editor are assumed by Muriel Beuschlein of Chicago. She is a teacher in Parker Elementary School, where she shares a room full of animals and a room in the college greenhouse with some 270 children in grades 5A to 8A. Mrs. Beuschlein has three children; her husband and children share her interest in living things. Her outstanding contribution to education is probably her list of teaching aids.

The new managing editor graduated from Chicago Teachers College and holds the degree Master of Science from Northwestern. She is a member of

numerous professional organizations, in many of which she has held or is holding important offices. She is the secretary of Sigma Delta Epsilon, Lambda Chapter; this is an honorary science fraternity for women. She has published many articles in educational and scientific journals, including two in *The American Biology Teacher*. She has been an active member of THE NATIONAL ASSOCIATION OF BIOLOGY TEACHERS for many years and has made many contributions to its activities.

The entire staff of *The American Biology Teacher* takes this opportunity of welcoming Mrs. Beuschlein to the managing editorship and also of thanking Betty Lockwood, retiring managing editor, for the excellent job she did last year.

EDUCATION CON- FERENCE

The Twenty-ninth Conference on the Education of Teachers in Science is to be held on the Ball State Teachers College campus in Muncie, Indiana, on November 8, 9, and 10, 1951.

This program will have such speakers as S. R. Powers, Professor of Natural Sciences, Columbia University; Glenn Blough and Paul Blackwood, Science Specialists of the United States Office of Education; Mr. Joe Craw, Superintendent of New Castle, Indiana, Schools; W. P. Allyn, Professor of Zoology, Indiana State Teachers College; E. Laurence Palmer, Professor of Nature and Science Education, Cornell University; and others of wide science experience. Robert H. Cooper, Head of the Science Department, Ball State Teachers College, is president at this time. Rose Lammel of New York University is first vice-president.

If any further information is needed, it may be obtained from R. H. Cooper, Head of the Science Department, Ball State Teachers College, Muncie, Indiana.

The 1951 Meeting

The annual meeting of THE NATIONAL ASSOCIATION OF BIOLOGY TEACHERS will be held in Philadelphia, December 27-30, in conjunction with the annual meeting of the AAAS. Headquarters for NABT will be the *Adelphia*, located at Chestnut and 13th Streets.

The following hotel information has been received. The housing bureau for the meeting wishes us to point out "the advantages of colleagues sharing the same room (economy, etc.)."

| <i>Hotel Name and Location</i> | <i>Single</i> | <i>Double</i> | <i>Twin-Bedded</i> | <i>Suites</i> |
|---|---------------|----------------|--------------------|-----------------|
| <i>Bellevue-Stratford</i> Broad and Walnut Sts. PE 5-0700 | \$5.00-\$5.50 | \$8.00-\$ 9.50 | \$ 9.00-\$12.00 | \$20.00-\$30.00 |
| <i>Benjamin Franklin</i> Chestnut and 9th Sts. WA 2-8600 | \$5.00-\$6.50 | \$7.50-\$ 9.00 | \$10.00-\$11.50 | \$15.00-\$20.00 |
| <i>Adelphia</i> Chestnut and 13th Sts. RI 6-3000 | \$5.00-\$6.00 | \$8.00-\$10.00 | \$ 8.00-\$12.00 | \$20.00-\$35.00 |
| <i>John Bartram</i> Broad and Locust Sts. KI 6-1100 | \$4.50-\$5.50 | \$7.00-\$ 8.00 | \$ 8.00-\$10.00 | \$16.00-\$18.50 |
| <i>Sylvania</i> Locust St., near Broad PE 5-7200 | \$4.50-\$6.50 | \$8.00-\$10.00 | \$ 9.00-\$11.00 | \$17.00 |
| <i>Drake</i> 1512 Spruce St. KI 5-0100 | \$5.00-\$7.00 | | \$ 9.00 | \$15.00 |
| <i>Ritz-Carlton</i> Broad and Walnut Sts. PE 5-7800 | \$6.50 | | \$10.00 | \$16.00 |
| <i>Warwick</i> Locust and 17th Sts. PE 5-3800 | \$5.00-\$8.00 | \$7.00-\$ 9.00 | \$ 8.00-\$11.00 | \$18.00-\$22.00 |

Prices are subject to change, but are not likely to do so.

ELECTION NOTICE

(The Nominating Committee appointed by the Executive Board has submitted the following list of nominees for officers of The National Association of Biology Teachers for the ensuing year. The Secretary-Treasurer is sending ballots to all members.)

For President-elect:

BROTHER H. CHARLES, F.S.C. (Charles F. Severin)—Professor of Biology, Saint Mary's College, Winona, Minnesota; B.S., M.S., Ph.D., Chicago; 16 years of teaching in high

school, 8 years of teaching in college, author of a textbook in high school biology, a workbook for high school biology and a handbook for biology teachers, founder of Chicago Catholic Science Teachers Association, member of numerous educational and scientific societies; charter member of NABT; author of numerous articles in *The American Biology Teacher* and other journals; associate editor of ABT since 1940.

ALDINA SCAFE GATES—Biology instructor, Baton Rouge, Louisiana, Senior High School; B.S., M.S., Louisiana State University, advanced study at George Washington Univer-

sity; 15 years teaching experience, three years with Louisiana Agricultural Experiment Station working with animal nutrition; author of several articles; member of AAAS, Louisiana Academy of Science, American Camellia Society, Baton Rouge Camellia Club, Baton Rouge Garden Club; active in many committees of NABT and at present Regional Membership Chairman; Sponsor of Baton Rouge Biology Club; chairman of High School Section of Louisiana Academy of Science.

LEO F. HADSALL—A.B., M.A., Bucknell University; Ph.D., Cornell University. Charles Lathrop Pack Fellow Nature and Forestry Education; Sigma Xi, Phi Delta Kappa, Cornell University. Taught in elementary and secondary schools of Pennsylvania and New Jersey; Professor of Biology, Fresno State College since 1932; Summer Session Instructor, Sierra Summer School, St. Cloud State Teachers College, University of California. Author professional articles in California Journal of Secondary Education, California Journal of Elementary Education, School Science and Mathematics, Science Education, Science Guide for Elementary Schools, Cornell Rural School Leaflet, and *The American Biology Teacher*. Research on Ecology of *Araucaria Bidwilli*, Life History of *Bassariscus astutus*, Reproduction of *Gopherus Agassizi*, and Impaling Habits of California Shrike. Membership in many science and professional organizations including NABT.

For First Vice-President:

ALFRED G. LINSCHIED—Head of Biology Department, Shaker Heights High School, Cleveland, Ohio; B.A., Oberlin, M.S., Western Reserve, advanced work at Western Reserve; 28 years of teaching and supervisory experience; member of National Education Association, Ohio Education Association, National Science Teachers Association, AAAS and NABT, sergeant in Medical Department of United States Army during World War I.

ROBERT C. McCAFFERTY—Biology instructor, Wadsworth High School, Akron, Ohio; B.S., M.S., and one additional year, The Ohio State University. Taught 15 years in Ohio

high schools, also extension instructor, Kent State University, Kent, Ohio. For one year an employment manager in Columbus. Was secretary and later vice-chairman, Biology Section, Central Ohio Teachers Assn.; first vice-president, The Wadsworth City Teachers' Assn.; and associate editor, *The American Biology Teacher* for 4 years, to which he has contributed briefs, reviews, and 5 articles. Membership in 10 professional organizations, including the ones with which NABT is associated, especially in connection with the annual meetings.

For Second Vice-President:

ARTHUR J. BAKER—Biology instructor, Crystal Lake Community High School, Crystal Lake, Illinois; graduate, Whitewater State Teachers College; M.S., Marquette University; advanced study at University of Illinois. Charter member of NABT and regular contributor to *The American Biology Teacher*, Health Committee of NABT and membership chairman for Illinois; sponsor of a high school Health Project which has won national recognition; pioneer in education for family living and member of a statewide committee working on a course of study for this field of education.

SISTER CLARETTA EASTER, O.P.—Biology instructor, Trenton High School, River Forest, Illinois; A.B., Rosary College; M.A., University of Wisconsin. Twenty-six years of teaching experience in Wisconsin, Illinois, Iowa, Minnesota and South Dakota; member of numerous educational and scientific organizations including AAAS and NABT; chairman of the membership committee of the Illinois Academy of Science; author of numerous scientific and educational articles.

CLIFFORD D. KNAPP—Biology instructor, Gallatin County High School, Bozeman, Montana; B.S., M.S., University of North Dakota, advanced study at University of Montana Biological Station. Twenty-eight years of teaching and supervisory experience in Montana and North Dakota; author of numerous articles in biology and health education, member of Montana State Health Planning Committee, chairman of Health Committee of NABT, member of Gallatin

County Health Council; president Gallatin County teachers association; regional chairman of NABT for Region VIII; member of numerous scientific and educational societies.

For Secretary-Treasurer:

JOHN P. HARROLD—Biology instructor, Senior High School, Midland, Michigan; B.S., Western Michigan College of Education; M.S., University of Michigan; advanced study at Michigan State College. Member of numerous educational and scientific organizations, Michigan membership chairman for NABT in 1947, Secretary-Treasurer since 1948; specially interested in conservation and in science curriculum coordination between elementary and secondary grades.

Nominating Committee,
LYDIA ELZEY, *Chairman,*
PREVO WHITAKER,
BETTY LOCKWOOD.

Biological Briefs

CARSON, RACHEL L. The Shape of Ancient Seas. *Nature Magazine*, Vol. 44, No. 5, p. 233, May, 1951.

Since 1930 a steady but slow rise of the sea level in the Atlantic and Gulf coasts has been measured by the tide gauges. It is interesting for man to observe the rising sea since he seldom has the opportunity to observe one of the earth's great rhythms. This recent advance in sea level may have begun at the close of the Ice Age and is just now being detected. It is not known that similar rises in sea level are occurring elsewhere.

If the Atlantic sea level rose 100 feet it would invade great areas of eastern United States, but such an invasion would not compare to the Cretaceous sea formed by invading seas that covered half of North America. Such invasions have occurred over and over again. Nearly all parts of the earth have been covered by a sea at one time or another. These inland seas have produced such natural wonders as the Chalk Cliffs of England, Chalk deposits of Kansas, Niagara Falls of New York, and the caves of Kentucky.

The causes of sea invasions are volcanoes on the ocean floor, glaciers, and the mobility of the earth's crust. The four advances and retreats of glaciers during the Pleistocene, a period well within the time of man on earth, have led to much speculation as to the glaciers' effects upon the sea. Most guesses are that as the ice piled up the ocean level decreased as much as 400 feet. Glaciers have been and are now disappearing; the sea is rising.

GUSTAFSSON, AKE. Marxist Genetics at the Stockholm Botanical Congress. *The Journal of Heredity*, Vol. 42, No. 2, pp. 55-59, March-April, 1951.

In the Soviet Union, Michurin is recognized as the founder of modern biology and Lysenko is his prophet. There was a good opportunity to compare western genetics with Lysenkoism at the 1950 Botanical Congress of Stockholm. Russian delegates were: Soukatchev, Henkel, Gludtschenko, Baranov, Suchov, Turbin, and Stoletov. V. N. Soukatchev of the Forest Research Institute of the Academy of Sciences is recognized as a high ranking botanist. Professor Henkel is a plant physiologist who is reasonably well versed in genetics. Professor Gludtschenko is primarily a defender of Lysenkoism. The rest of the representatives were less known and less vociferous.

The Russian delegates severely attacked western genetics and branches of biology that consider genes and chromosomes in their studies. The theme around which the Russian delegates build their theses is Lysenko's statements that heredity can be changed by means of grafting, that hexaploid wheat can easily arise from tetraploid wheat or that winter wheat will arise from the spring variety depending when it is planted, and that Mendelism has failed to improve the status of a people. The Russian delegates declared that Darwin's theses have been forgotten outside the Soviet Union, where Lysenko keeps them alive. Lysenko does not however consider Darwin's selection theory or the struggle for existence. He adheres to Darwin's view on gradual changes of heredity by environmental conditions—this thesis incidentally was not presented in the first edition of "Origin of Species."

Professor Gustafsson concluded his article, "The Soviet Russian visit to the Stockholm Congress, so auspicious from a general point of view, unfortunately confirmed the fact that Russian biology of today is not what it once was. It proved that the fame of Trofim Lysenko rests on chimaera, if this expression be pardoned me. As an agronomist he possibly promoted the increased mechanization of agriculture. As a scientist he is uncritical and biased. Finally, as a biologist, he has destroyed what was so successfully built up by Soviet scientists who now exist no more. Ultimately if not swept away, his ideas will ruin Soviet agriculture.

TED F. ANDREWS,
State Teachers College,
Emporia, Kansas

FILMS

GOOD EATING HABITS (1 reel, sound, color or B & W; Educational Collaborator: Clifford J. Barborka, M.D., Associate Professor of Medicine, Northwestern University Medical School). When youngsters see how Bill, a boy just like them, becomes ill because of his improper eating habits, they're sure to take a new interest in the proper way to eat. They'll see how important it is to eat slowly, chew foods thoroughly, avoid excessive sweet foods—especially between meals—and why they should eat what is served to them at mealtimes. High School, College.

FIELD TRIP TO A FISH HATCHERY (1 reel, sound, color or B & W; Educational Collaborator: N. E. Bingham, Ph.D., Professor of Education, University of Florida). A class takes a film field trip to a fish hatchery. They discover the answers to the following questions: Why do we have fish hatcheries? What do they look like? What happens there? How do fish live? In this interesting film you will see fish eggs taken from the female, fertilized, hatched and developed from fry into fingerlings. Important details about the structure of fish and how fish are planted in the streams and lakes are also included. An excellent study in field trip techniques, conservation, biological science and reading background. Junior and Senior High School.

Another filmstrip for Upper Elementary and Junior High School Grades, *HOW THE HEART WORKS*, has just been released for general sale by the Audio-Visual Division of Popular Science Publishing Company, producers of the filmstrip for the Popular Science Filmstrip-of-the-Month Club.

Consisting of 51 frames, *HOW THE HEART WORKS* is a color filmstrip that employs a variety of visual media such as photographs, cutaways, drawings, charts, diagrams, text frames, etc. It will be helpful to Junior and Senior High School teachers of General Science and Biology as well as to Upper Elementary and Junior High School teachers of General or Introductory Science. A Teaching Guide illustrated with reproductions of all the frames and containing specific questions and suggestions for each frame comes with the filmstrip.

For further information consult Popular Science Publishing Company, Audio-Visual Division, 353 4th Avenue, New York 10, N. Y.

BOOK REVIEWS

JAHN, T. L. and FRANCES JAHN. *How to Know the Protozoa*. Wm. C. Brown Co., Dubuque, Iowa. 227 pp. 394 figures. Spiral bound. 1949.

The purpose of this book is to present information about the Protozoa in an informal manner, primarily for the less advanced students. The information is, however, accurate enough to be useful to the specialist.

The first 40 pages of the book are devoted to general information about Protozoa. This information falls under 16 headings, although the table of contents only lists eleven. The sections are written clearly and include many good simple illustrations and analogies. Important ideas are presented simply and certainly not verbosely.

Four subphyla of the Protozoa are treated in this book: (1) Ciliophora, (2) Mastigophora, (3) Sarcodina, and (4) Sporozoa. There are dichotomous keys to subphyla, classes, orders, families and genera. Naturally, not all species are included in such a small book, but each species included is illus-

trated in such a manner as to show characteristics used for identification purposes. Accompanying the sketches of each species are a few brief statements, pointing out noticeable characteristics. Each species shown was selected for one or both of two reasons: 1. It is common and the student is apt to find it; 2. It is different from other species shown.

There is an illustrated glossary and index combined.

There are several errors which were apparently typographical: 1. One of the authors' names was left off of the cover; 2. Numbers of figures and pages within the text are not consistent, e.g., on p. 39, first sentence, last paragraph, "p. 169" is given in bold face—other numbers are not; 3. Names of orders are inconsistently spelled, e.g., p. 42, Mycetozodia, and p. 136, Mycetozoida; and 4. Table of contents is incomplete.

The book is well done and it provides high school and college teachers for the first time with an easily used book on the Protozoa. It should encourage a more widespread distribution of knowledge of the Protozoa among non-specialists.

TED F. ANDREWS,
State Teachers College,
Emporia, Kansas

ALLEE, W. C. *Cooperation Among Animals—With Human Implications*. Henry Schuman, Inc., Publishers, 20 East 70th Street, New York 21, N. Y. 233 pp. illus. Revised Edition. 1951. \$3.50.

The subject matter of this book, cooperation among animals—with human implications, is one not frequently presented in science education journals. In a world which can be thrown into global confusion by an influential Hitler or a Stalin, a realist necessarily wonders what impact this excellent work, especially the human phase, will have on current society. Perhaps, in a few centuries the full significance of this book, and similar ones which are certain to follow, will be meaningful as men learn to work toward world unity through cooperation. The answer lies in the future. In the meantime, the author's concluding paragraph ends with a hopeful suggestion. He states, "Widely dispersed knowledge concerning the impor-

tant role of basic cooperative processes among living beings may lead to the acceptance of cooperation as a guiding principle both in social theory and as a basis for human behavior. Such a development when it occurs will alter the course of human history."

Teachers of biology and sociology who want a broad comprehensive survey of this field, ranging from the protozoa to insects and to man, would do well to study this text. Data based on the author's research, as well as that of others, is presented. The content is supplemented by a selected list of 142 references, and is illustrated with five plates and forty-eight figures. An index is included.

LEE R. YOTHERS,
High School,
Rahway, New Jersey

BARNARD, DARREL J., and LON EDWARDS.
Basic Science. The MacMillan Co., New York. vii + 631 pp. 1951.

The textbook is divided into 13 units and 31 chapters, with over 450 illustrations. There is no bibliography, but there is a well-organized index.

The first unit, Science in Everyday Life, is an explanation of what science means to people who are not scientists, what science means to scientists, and an explanation of the scientific method and its use. The remaining units of the text are divided among the various theoretical and practical aspects of physics, chemistry and biology.

Scientific words and expressions are explained on first appearance in the text and only those words which are infrequently used or especially abstract or difficult appear in the glossary. The index shows in bold face figures the page on which each word is defined and lists the pages where its meaning is subsequently developed. A work book has been written to increase the students skill in the scientific method, and a teacher's manual to present the philosophy of science education underlying *Basic Science*. In the reviewer's opinion the text is superbly written and very well illustrated.

CHARLES GRAVES,
State Teachers College,
Emporia, Kansas

DARLINGTON, C. D., and MATHER, K. *Genes, Plants and People—Essays on Genetics*. The Blakiston Company, Philadelphia 5, Pa. xxi+187 pp. illus. 1950. \$4.00.

This concise book is a series of articles published in a collected edition to meet the demand for the separate articles of which reprints are no longer available. The original essays were written over a period of nearly twenty years during most of which time the two authors were working together to solve the same problems from different points of view. The essays deal with plants and animals, medicine and agriculture, and offer new interpretations of evolution, development and disease.

The series should serve to introduce the concepts and methods of genetics to the general student, as it shows the sequence of ideas during a critical period of its development and especially the interaction of the two methods of experimental breeding and microscopic observation which has led to the establishment of modern genetic theory. Several articles deal with the controversy between the genetic theory based on the traditional scientific method and that propounded by the latest Soviet school represented by T. D. Lysenko.

All teachers will enjoy the review of old ideas. The authors make them seem fresh and alive again. All students of Genetics will want this book.

CHARLES C. HERBST,
*Beverly Hills High School,
Beverly Hills, California*

DU SHANE, GRAHAM, and DAVID REGNERY. *Experiments in General Biology*. W. H. Freeman and Company, San Francisco. vii+181 pp. illus. 1950.

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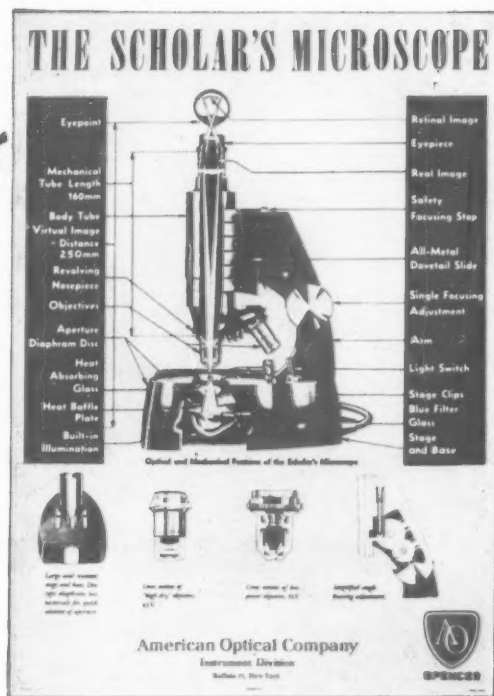
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